DRAFT ENVIRONMENTAL ASSESSMENT

Issuance of an MBTA Permit to the National Marine Fisheries Service Authorizing Incidental Take of Seabirds in the Hawaii-based Shallow-set Longline Fishery

U.S. Fish and Wildlife Service, Pacific Region
Portland, Oregon

January 10, 2012

Executive Summary

The U.S. Fish and Wildlife Service (Service) has prepared this Draft Environmental Assessment (DEA) to address an application received from the National Marine Fisheries Service (NMFS) for a permit under the Migratory Bird Treaty Act (MBTA) to authorize incidental take of seabirds in the shallow-set sector of the Hawaii-based longline fishery. The permit sought is a Special Purpose permit, which is described in Title 50 of the Code of Federal Regulations, section 21.27. NMFS is the Federal agency with regulatory responsibility for this fishery, which operates in the North Pacific, and has regulations in place intended to reduce incidental mortality and injury of protected species, including seabirds. Take is principally of two species of albatrosses, the Laysan and Black-footed albatrosses (*Phoebastria immutabilis* and *P. nigripes*, respectively).

We evaluate three alternatives to our permitting action in this DEA: no action; issue permit as requested; and issue permit with additional conditions to conduct new research and to increase conservation benefit to seabirds. A fourth alternative considered but excluded from analysis would require NMFS to change operations of the fishery to improve the conservation benefit to seabirds, including possible change to fisheries regulations.

Because the amount of take reported in the fishery is low and the best available scientific information indicates that the populations of Laysan and Black-footed Albatrosses are stable or increasing, our analysis indicates that none of the alternatives would lead to significant impacts to the birds during the next three years (the term of a Special Purpose permit). The distinction between the alternatives lies in the differing degrees of new information to be gained under each with respect to the mechanisms causing the current take in the fishery and the identification of remedies for this take and/or other benefits to seabirds. As a result of our analysis, we identify Alternative 2 as our preferred alternative in this DEA. We seek public comment on this DEA in an effort to ensure that our analysis is complete and includes all relevant information.

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1: Purpose and Need for the Action

1.1 Introduction

On August 10, 2011, the U.S. Fish and Wildlife Service (Service) received an application from the National Marine Fisheries Service Pacific Islands Regional Office (NMFS-PIRO) for a Special Purpose permit under the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711: 40 Stat. 755; MBTA). The permit, if issued, would authorize NMFS to take migratory birds, principally two species of albatrosses, pursuant to its regulation of the shallow-set longline fishery based in Hawaii ("fishery" hereafter).[1] This fishery operates on the high seas and within the United States Exclusive Economic Zone (EEZ). The application requests a permit for the take of the four seabird species that, based on existing data, may be taken incidentally during the operation of the fishery: Laysan Albatross (*Phoebastria immutabilis*), Black-footed Albatross (*P. nigripes*), Sooty Shearwater (*Puffinus griseus*), Northern Fulmar (*Fulmarus glacialis*). The application also requests authorization of the take of one species with no reported take in the fishery, the endangered Short-tailed Albatross (*P. albatrus*). Based on the Service's prior analyses under Section 7(a)(2) of the Endangered Species Act (ESA), this species is likely to be adversely affected by the operation of the fishery (Service 2000, 2004). We have reviewed the application (see Appendix 1) and it is complete.

This Draft Environmental Assessment (DEA) describes the project and the application; presents the authorities under which the Service is acting on the application; and analyzes three alternatives and associated direct, indirect, and cumulative impacts. It will help the Service make a decision regarding permit issuance, and determine whether to prepare an environmental impact assessment. The Service is undertaking this DEA to address its obligations under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq*.; NEPA).

1.2 Background

The proposed action is to determine the consistency of NMFS-PIRO's application with the permitting criteria, and either deny or issue a Special Purpose permit under the MBTA that authorizes NMFS to take birds incidental to the operations associated the fishery based out of Hawaii. The Service issues Special Purpose permits under the MBTA (50 CFR 21.27) to authorize take for activities not covered by other Part 21 regulations such as salvage and educational use, and invasive species eradication on islands.

NMFS manages and regulates this fishery under the Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region (Pelagic FEP; WPFMC and NMFS 2009). This fishery management plan was developed by the Western Pacific Regional Fishery Management Council (WPFMC) and approved by the Secretary of Commerce. Under the Magnuson-Stevens Act (16 U.S.C. 1801), WPFMC proposes amendments to fishery management plans that NMFS either approves, partly approves, or disapproves. Approved amendments or portions thereof are

[1]Throughout the document, we distinguish between the fishery for which permit application seeks authorization (the shallow-set sector of the Hawaii-based longline fishery), and the Hawaii-based longline fishery at large or the deep-set sector of the Hawaii-based longline fishery.

implemented by NMFS regulations; NMFS is responsible for complying with NEPA with respect to those regulations.

The shallow-set sector of the fishery, which targets swordfish (*Xiphias gladius*), is an open-ocean fishery that began in the late-1980s and has since been managed under the Pelagic FEP. This fishery operates in waters within the 200-mile U.S. Exclusive Economic Zone (EEZ) and on the high seas of the Pacific Ocean, generally between 140° and 180° W longitude and 20° and 40° N latitude (see Appendix 1). About 27 vessels participated in the fishery each year between 2004 and 2010. Shallow-set longlining consists of deploying a mainline 18 to 60 nautical miles (NM) in length with floats at 360 meter (m) intervals. The mainline depth is 25 to 75 m. About four branchlines, 10 to 20 m in length, with baited hooks and light sticks to attract swordfish, are suspended between floats for a total of approximately 700 to 1,000 hooks per fishing event or "set". The line is deployed or "set" after sunset, "soaked" overnight, and retrieved or "hauled" in the morning.

Seabirds (as well as sea turtles and other non-target species) can be killed or injured on either the set or the haul when they are unintentionally hooked or entangled in fishing gear. Injury and mortality meet the definition of "take" for the purposes of the MBTA (Title 50 in the Code of Federal Regulations [CFR], section 10.12). Seabirds are hooked or entangled in lines during the set typically because they are pursuing baited hooks as they are cast into the water. The birds drown when they are dragged under the surface. Overnight, while the gear is soaking, some dead birds may be scavenged from the hooks by marine predators or may drop off the gear. These birds are lost from observation, but studies of seabird interactions have yielded measurements of "drop-off rates" (e.g., Brothers 1991, Gilman *et al.* 2003). A drop-off rate is described in detail and applied as a correction factor in estimation of total take in section 4.1, Impacts to Seabirds. Mechanisms underlying the take of seabirds during gear haulback are not well understood, but may include practices that make baited hooks available to birds and/or attract and habituate seabirds to feeding around fishing vessels. When the gear is hauled in the morning, seabirds may become entangled or hooked on gear and brought aboard after a relatively short interval, alive but injured. Birds brought on board injured are handled and released under regulations intended to improve their likelihood of survival (NMFS 2002), but no information exists on survival rates of birds that are released injured.

Between 2001 and the present, NMFS has issued numerous NEPA documents and regulations governing the operation of the Hawaii-based longline fishery (shallow- and deep-set sectors) in particular to address take of protected species, including seabirds, that occurs in the fishery (NMFS 2002, 2004, 2005a, 2005b). The 2002 regulations codified the terms and conditions of the Service's first biological opinion on the impacts of the Hawaii-based longline fishery on the endangered Short-tailed Albatross (USFWS 2000). The shallow-set fishery was closed by court order in 2001 in response to litigation over take of threatened and endangered sea turtles, and NMFS prepared a comprehensive EIS analyzing impacts of all pelagic fisheries managed under the Fishery Management Plan that was current at that time (NMFS 2001). The current shallow-set fishery reopened in the fourth quarter of 2004 under new regulations intended to reduce the potential number and severity of interactions between fishing gear and sea turtles. These regulations included gear and bait requirements to reduce sea turtle interactions, limits on fishing effort (the number of shallow sets per year was capped at 2,120), and caps on sea turtle interactions which, if reached, would close the fishery for the remainder of the year (this occurred, for example, in 2006). NMFS issued a Supplemental EIS on these regulations (NMFS 2004). In 2004, the rulemaking that reopened the shallow-set fishery included the requirement that longline gear be deployed or "set" one hour after local sunset to reduce the likelihood of seabird take (NMFS 2004), and in 2005, additional regulations added side-setting, or deploying longline gear from amidships instead of from the stern, as an option that vessels could choose to employ to avoid and minimize seabird interactions (NMFS 2005b).

The annual limit on fishing effort imposed when the fishery reopened in 2004 was removed in 2010 through regulations issued by NMFS in 2009 (NMFS 2009a). These regulations codified a proposal by WPRFMC referred to as "Amendment 18." NMFS issued a final SEIS in conjunction with this rulemaking (NMFS 2009b). The fishery has yet to reach the former effort limit of 2,120 shallow sets per year, and NMFS does not anticipate that it will do so during the three-year term of a permit under the MBTA, although effort in the fishery has increased steadily since 2007(Appendix 1).

Five species of seabirds have been reported taken or are at risk of take in the fishery. Two species, the Laysan and Black-footed Albatrosses, make up more than 99 percent of the birds taken since 2004, and these two species are the focus of our analysis. One Sooty Shearwater and one Northern Fulmar also have been reported taken. Finally, we include in our analysis the Short-tailed Albatross (*P. albatrus*), an endangered species that forages with the other albatross species and has been observed from Hawaii-based shallow-set vessels. NMFS-PIRO and the Service are currently in formal consultation under section 7(a)(2) of the Endangered Species Act for effects of the entire Hawaii-based fishery (shallow- and deep-set sectors) on this species. The range of these five migratory bird species is much greater than the area where the fishery operates. These ranges overlap with the fishery and with other fisheries in the North Pacific.

A comparison of seabird take before the fishery was closed in 2001 and since it reopened in 2004 indicates that take of birds overall has declined substantially from pre-closure levels. Because the rate of observed take, as well as the absolute numbers, has declined, we tentatively ascribe this decline largely to the required use of seabird deterrent measures under NMFS regulations, especially night-setting, which entails deploying lines no earlier than one hour after local sunset. A quantitative comparison of take between the two time periods is complicated by differences in data collection: the fishery had only partial observer coverage prior to the 2001 closure, and consequently we only have data from a subset of the total number of hooks set in the years 1994 through 2000. However, a comparison of the observed rate of take in 1994-2000 and 2004-2010 indicates a roughly 90-percent decline in the average rate of take (birds taken per 1,000 hooks) observed.

Although regulations implemented by NMFS have led to an important reduction in take of migratory birds in this fishery, the take that remains is prohibited under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703-711; MBTA). Analyses of data collected by fishery observers, additional monitoring, consideration of recent studies and trials of new seabird deterrent measures, and consideration of new research and field trials may yield insights on how take of birds by this fishery might be reduced further. We consider these possibilities as well as other aspects of the human environment in evaluating a reasonable range of alternative permitting actions in response to the application from NMFS-PIRO.

1.3 Purposes and Need for Action

The conservation of migratory birds is a fundamental responsibility of the Service. The Service is tasked with implementing the MBTA, including issuing permits "for special purpose activities related to migratory birds … which are otherwise outside the scope of the standard form permits" (50 CFR 21.27). The need for the Service's permitting action is to fulfill the Service's obligation to respond to the applicant's request for a Special Purpose permit under the MBTA, as set forth by the regulations found in 50 CFR 21.27. This DEA analyzes the impacts on the human environment, including seabirds, of the various alternative responses to the application.

Two purposes of the proposed Federal action by the Service are to (1) ensure that issuance of a permit meets criteria established in our regulations under MBTA and does not violate our statutory responsibility to conserve migratory birds; and (2) ensure the Service and NMFS meet their responsibilities under Executive Order 13186 (E.O.) to protect migratory birds and avoid and minimize adverse impacts of our actions to these birds. In the commercial fishery under consideration for permitting, take of migratory birds is not the intent of this otherwise lawful activity, and cannot practicably[2] be completely avoided. The take of birds in this fishery is ongoing, but has been substantially reduced since the 1990s owing to regulations issued by NMFS that require the use of specific seabird deterrent measures as part of the fishery's operation (described above). Therefore, an additional purpose is to identify the mechanisms underlying the take of migratory birds in the fishery and measures for NMFS and the fishery to implement that would further improve conservation benefit for birds, as mandated in the E.O., and allow the fishery to operate legally under the MBTA. A final purpose is to minimize unnecessary costs or burdens on the fishery itself, or on NMFS in its role as regulator.

1.4 Authorities

<u>Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712)</u>.
The Service has the primary statutory authority to manage migratory bird populations in the United States under the MBTA. The original treaty was signed by the U.S. and Great Britain (on behalf of Canada) in 1918 and imposed obligations on the U.S. for the conservation of migratory birds, including adoption of a uniform system of protection for certain species of birds to ensure their preservation. The U.S. subsequently entered into similar conventions with Mexico, Japan, and Russia. Birds in the taxonomic family *Diomedeidae* (albatrosses) are taken in the fishery, are protected in the U.S. by the MBTA (see 50 CFR 10.13).[3] These birds are a trust resource managed by the Service for the American people, and the MBTA prohibits their take, absent authorization from the Service.

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[2] For the purposes of this document, we define "practicable" as achievable after taking into consideration, relative to the magnitude of the impacts to migratory birds, the following considerations: the cost of remedy compared to the applicant's resources; existing technology; and logistics in light of the overall purposes of the fishery.

[3] A single Sooty Shearwater (*Puffinus griseus*) and a single Northern Fulmar (*Fulmarus glacialis*) have been documented as taken in this fishery since 2004; the family Procellariidae, to which these species belong, also is covered under the MBTA.

Special Purpose permits
Regulations under the MBTA allow the Service to issue permits to take migratory birds for various reasons, such as depredation and scientific collecting. One of those regulations, 50 CFR 21.27, allows the Service to issue Special Purpose Permits in circumstances not addressed by the standard form permits. Special Purpose permits have a three-year term and may be renewed after that period. An application for a Special Purpose Permit must meet the general permitting conditions set forth in part 13 and make a sufficient showing of one or more of the following:

- benefit to the migratory bird resources,
- important research reasons,
- reasons of human concern for individual birds, or
- other compelling justification.

We will issue a Special Purpose Permit only if we determine that the take is compatible with the conservation intent of the MBTA. Standard conditions for permit issuance include those described in 50 CFR 13.21(e) and 21.27(c).

The nature of the activity for which a permit is sought, the regulation of a commercial fishery, may qualify only under the "other compelling justification" of the above permitting criteria. The other possible criteria cannot be met by the applicant in this case because:

- the commercial fishery carries no intrinsic benefit for migratory bird resources;
- the take that occurs is neither directed by, nor is the result of, important research; and
- the take that occurs does not result from concern for individual birds (i.e., relocation or euthanasia).

"Compelling justification" is not defined formally, either in the MBTA or in current Service policy or guidance. Therefore, we apply the term on a case-by-case basis to any application seeking a permit on that basis. For the purposes of evaluating this application, we will consider all of the information in the application in light of the purposes described in section 1.3. Thus, although the information in the application concerning the benefits of minimizing unnecessary costs or burdens on the fishery is important to the determination of whether there is a compelling justification for issuing a permit, the effect of the fishery on migratory bird conservation is equally relevant, as is the context of the degree to which the fishery will implement all practicable methods to avoid take of migratory birds.

1.5 Relationship to other Statutes, Regulations, or Plans

1.5.1 Endangered Species Act (16 U.S.C. 1531 et seq.)

Federal policy, under the Endangered Species Act (ESA), is for all Federal agencies to seek to conserve threatened and endangered species and use their authorities in furtherance of the purposes of the ESA (Sec. 2(c)). This includes the permitting action under review in this assessment. Also in accordance with the ESA, NMFS-PIRO is engaged in formal consultation under ESA section 7 with the Service's Endangered Species program to evaluate the impacts of the Hawaii-based longline fishery, including the shallow-set sector, on the endangered Short-tailed Albatross (*Phoebastria albatrus*). This consultation will serve as ESA compliance for our permitting decision. The results of jeopardy analysis under section 7 of the ESA, and any Reasonable and Prudent Alternatives or Measures stipulated in the Service's Biological Opinion inform aspects of our analysis and will be reflected in the final Environmental Assessment. The consultation is ongoing, but we expect to issue a Biological Opinion before we finalize this DEA, and no later than January 13, 2012.

1.5.2 National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347)

NEPA is our national charter for protection of the environment; it requires Federal agencies to evaluate the potential environmental impacts when planning a Federal action and ensures that environmental information is available to public officials and citizens before decisions are made and before actions are taken. NEPA requires neither a particular outcome nor that the "environmentally-best" alternative is selected. It mandates a process for thoroughly considering what an action may do to the human environment and how any adverse impacts can be mitigated. This assessment is produced in compliance with NEPA as well as to formalize our decision process for this permit.

1.5.3 Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (66 FR 3853, Jan. 17, 2001)

This Executive Order requires federal agencies, to the extent practicable, to avoid or minimize adverse impacts on migratory bird resources when conducting agency actions, and to restore and enhance the habitat of migratory birds. Specifically, it requires federal agencies to develop and use principles, standards, and practices that will lessen the amount of unintentional take reasonably attributed to agency actions. The proposed action, through its standards for incorporation of measures to reduce take of migratory birds, would be consistent with the goals of this Executive Order.

1.6 Scope of Analysis

This assessment evaluates the effects of various alternatives for permitting incidental take of the five seabird species listed above, but principally Laysan and Black-footed Albatrosses, in the operation of the shallow-set pelagic longline fishery based in Hawaii. Different permits and various special conditions associated with those permits might have potentially different effects on these seabirds, and on other aspects of the human environment. The potentially affected human environment includes seabird populations, the economy, cultural values, and Native American religious and cultural practices. In general, the analysis is conducted at the scale of the breeding and foraging range of the two albatross species that comprise more than 99% of the take in this fishery.

1.7 Scoping and Public Participation

1.7.1 Results of Internal Scoping

We solicited comments on an internal draft of the DEA from other programs within the Service. Their comments merit consideration here. We have compiled their major concerns and provide responses below.

1. Would the Service be delegating MBTA authority to NMFS if a permit were issued to them following this NEPA process? Shouldn't individual permits be issued to the fishers who actually do the taking?

Although we have the authority to issue Special Purpose permits to individuals, including the participants in this fishery, the participants in this fishery have not applied for a permit. NMFS has. If issued, the permit will authorize take only with respect to NMFS—it would not provide take authorization for any of the participants in this fishery.

Even if we received applications from participants in the fishery, we would not necessarily issue them permits. First, it might be more difficult for an individual participant to make a sufficient showing of a compelling justification. Second, individual participants are not directly subject to citizen suits under the Administrative Procedure Act.

2. Might the success of Federal prosecutors in cases of MBTA violations be compromised by our issuing a permit to NMFS as a result of this analysis?

We have a pending application that must be evaluated and processed in accordance with the regulatory standards and procedures of 50 CFR Parts 13 and 21, and any final decision on the application must be made consistent with the statutory provisions of the MBTA as well as the provisions of the migratory bird treaties. If the final decision is to grant the permit, that decision will be based on the particular facts and legal provisions that exist with respect to the permitted activity. Any subsequent permitting decision will similarly be focused on the particular factual and legal circumstances that attach to each future application. Likewise, future actions that involve the taking of migratory birds incidental to an otherwise-lawful activity, without a permit, will be evaluated by FWS enforcement personnel and the Department of Justice on the particular facts and law that apply in each instance. Any decision to grant the NOAA permit application should not have any bearing on the future application or enforcement of the MBTA.

3. Would issuance of a permit for this fishery, if it were to occur following the NEPA analysis, set a precedent that other agencies (*e.g.*, U.S. Forest Service, U.S. Department of Agriculture, State agencies) and industries (*e.g.*, wind power, telecommunications) might want to follow? This could create an insupportable workload for the Service.

Under the MBTA, the Service has discretion to permit actions that result in take and to evaluate applications for take on a case-by-case basis, regardless of precedent. The analysis in this DEA will help the Service decide whether or not to issue a permit in this case, whether the criteria under which we might issue the permit are met, and what conditions to attach to a potential permit to ensure the conservation intent of MBTA is upheld. How other agencies or industries will respond to the analysis in this DEA and the Service's ultimate decision with respect to permit issuance is difficult to predict. Some agencies might reconsider their own regulatory activities that result in incidental take of migratory birds, and apply for a similar permit as a result of this analysis. However, each permit application will require a similar review and determination as followed in this case.

4. Similarly, as a result of this analysis, could the Service possibly issue a permit under the Special Purpose permit regulation that would achieve little or no substantive conservation benefit, setting a 'low bar' for future permit applicants?

Included in the analysis of each alternative is an evaluation of the conservation benefits, and the significance of the conservation benefits achieved under any of the alternatives must consider not only the permit timeframe, but also a longer timeframe that includes the likelihood of subsequent permit renewals. The measures suggested in the alternatives to achieve conservation benefit are steps toward the long-term goal of reducing bycatch.

5. Why would we not issue a Scientific Collecting permit (50 CFR 21.23) instead of a Special Purpose permit (50 CFR 21.27) to NMFS in this case?

NMFS submitted an application for a Special Purpose permit and not for a Scientific Collecting permit. We would request a research proposal from NMFS if they applied for a permit to collect birds as part of a scientific investigation. However, NMFS is not pursuing a scientific investigation that involves taking birds. The permit we are considering in this action is for the take of birds incidental to fishing activities that are otherwise lawful; it is not for taking birds to answer research questions.

1.7.2 Public Comment Period

This DEA is available to the public for a 30-day comment period, which closes on February 9, 2012 (Service 2012). We will rely upon those comments as scoping under NEPA and consider those comments in developing the final Environmental Assessment for this action.

2: Affected Environment

This section describes the marine environment that is the intersection between the world of seabirds and the Hawaii-based shallow-set longline fishery. Since the permit requested would be issued for the incidental take of seabirds, the emphasis here is on aspects of seabird behavior and natural history that make them susceptible to take in this fishery. Although many species of seabirds have been observed from vessels in this fishery, Laysan and Black-footed Albatrosses suffer the highest rates of mortality (these two species comprise 99 percent of all the seabird take in the fishery) and are thus the focus of this section. Several documents have summarized this information already, and they are liberally cited and incorporated by reference (Naughton *et al.* 2007, Awkerman *et al.* 2008 and 2009, Arata *et al.* 2009).

The affected environment encompasses the at-sea ranges of the Laysan and Black-footed Albatrosses (Fig. 1) and all areas where the Hawaii-based shallow-set fishery operates, including areas transited by vessels to and from fishing grounds. The shallow-set fishery typically deploys longline gear between 140°W and 180°W longitude and 20°N and 40°N latitude, with the majority of longline fishing effort concentrated between 25°N and 35°N latitude (Appendix 1 [Fig. 9]).

2.1 Seabirds

Seabirds are a collection of many different families of birds that share the trait of making their living at sea. The species taken in this fishery only come to land to breed. Birds of the Order Procellariiformes, including albatrosses, shearwaters, petrels, storm-petrels, and allies, are the most notable pelagic nomads. All but the storm-petrels have generally long, narrow wings, which allow them to take advantage of the wind-speed gradient above the world's oceans using a characteristic flying technique called dynamic soaring; thus they can cover great distances with minimal flapping. These species also have a well-developed sense of smell and can detect fish oils and fish parts from great distances, allowing them to steer upwind to concentrations of squid, fish, fish eggs, and crustaceans. Tickell (2000) and Awkerman *et al.* (2008, 2009) suggested that they find fishing vessels in the same way.

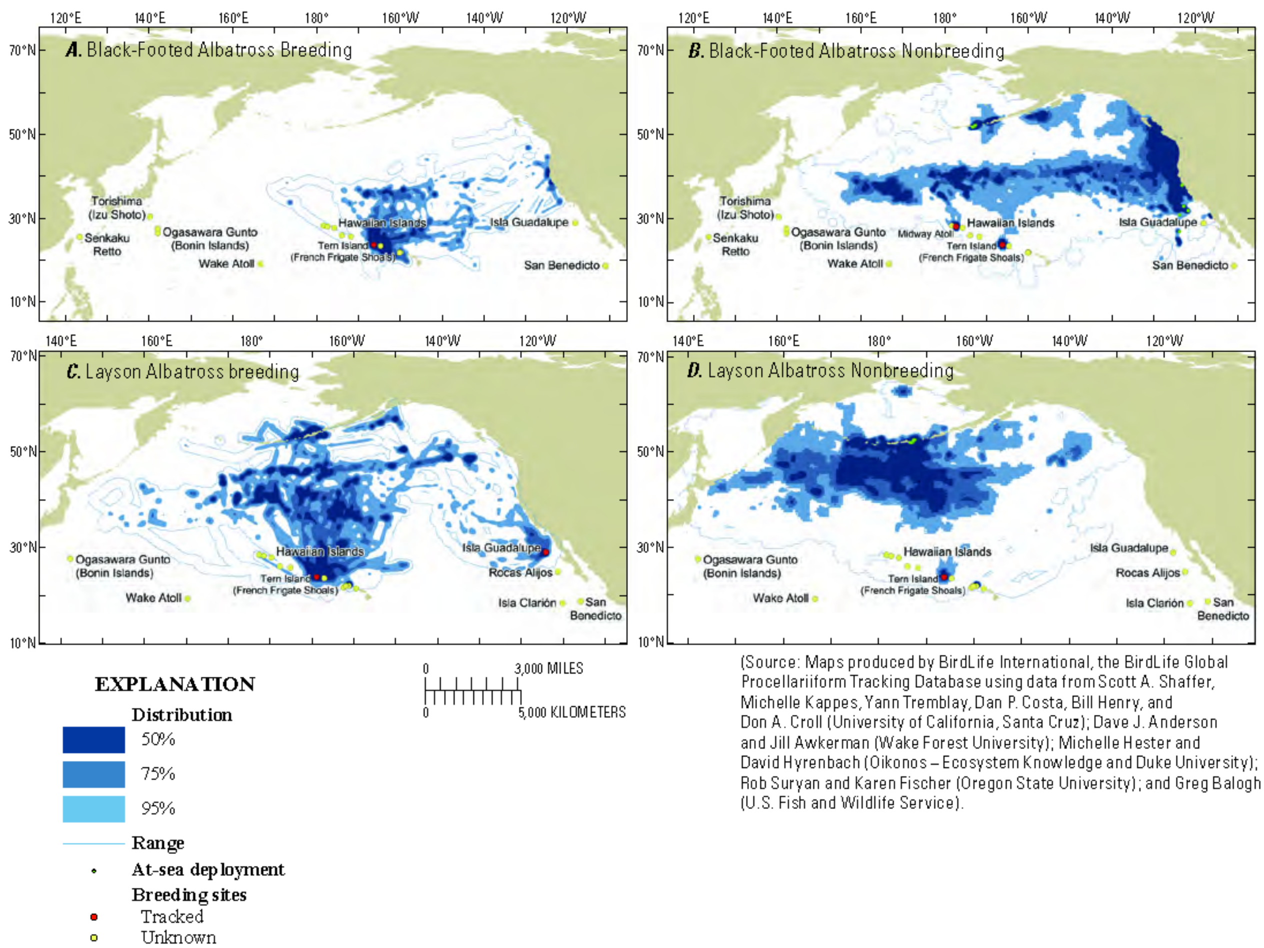

Figure 2.1 Breeding and non-breeding ranges of Black-footed and Laysan Albatrosses. From Arata *et al.* 2009.

2.1.1 Laysan and Black-footed Albatrosses

These species share the genus *Phoebastria* with the Waved and Short-tailed Albatrosses (*P. irrorata* and *P. albatrus*), also distributed in the North Pacific Ocean. Laysan and Black-footed Albatrosses are moderate-sized among albatrosses; they weigh approximately 5.4–7.5 lbs. (2.4–3.4 kg), with wingspans between 6.3 and 7 feet (193–215 cm) (Awkerman *et al.* 2008, 2009).

Both species forage during the day and night, although the majority of foraging activity takes place in daylight (Fernandez and Anderson 2000, Pitman et al. 2004). Although the setting of longline gear at night probably reduces the likelihood of seabird interactions, deck lighting, which attracts seabirds, plays an important role in the effectiveness of this deterrent measure. Black-footed Albatrosses actively feed on fishing offal and discards, and their abundance is significantly affected by the presence of fishing boats (Hyrenbach 2001).

Black-footed and Laysan Albatrosses begin breeding at 8 or 9 years of age (range 5–16), and generally breed every year with the same mate until death; mates are replaced if one member of the pair dies. Some pairs occasionally skip a breeding season. One egg is laid per year, and nesting takes six months from the time the egg until the chick fledges. Albatrosses are long-lived and may reach 60 years of age or more.

Laysan and Black-footed Albatrosses nest on islands distributed across the North Pacific Ocean (Fig. 2). However, the Northwestern Hawaiian Islands,[4] primarily Midway Atoll and Laysan Island, support more than 99 percent of the world's Laysan Albatrosses, and 95 percent of the world's breeding Black-footed Albatrosses. Both species nest in much smaller numbers on the main Hawaiian Islands of Kaula, Lehua, Niihau, Kauai, and Oahu (Harrison 1990; VanderWerf *et al.* 2007). They have recently recolonized Wake Island in the central Pacific, but only Laysan Albatrosses have successfully fledged a chick from this location (Rauzon *et al.* 2008). Both species also breed on a few islands in Japan and Mexico. The use of islands off the Mexican coast represents a recent breeding range expansion (Dunlop 1988, Pitman *et al.* 2004). Several historically large colonies in the central and western Pacific were extirpated by feather hunters in the late 19th and early 20th centuries, and these colonies have not reestablished (Rice and Kenyon 1962, Tickell 2000).

[4] These islands are encompassed by the Papahānaumokuākea Marine National Monument and World Heritage Site, which is cooperatively managed by the Service, NOAA, and the State of Hawai'i.

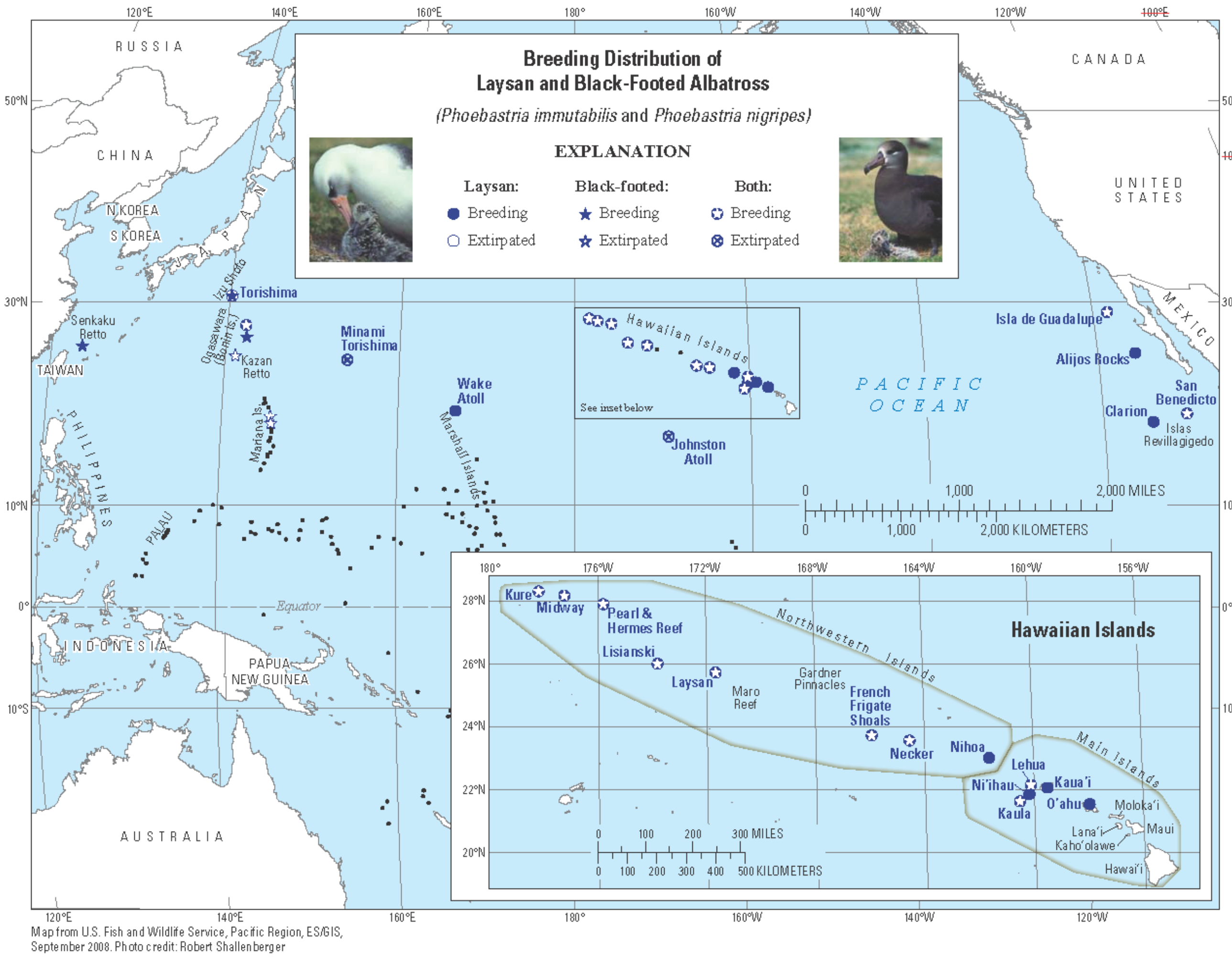

Figure 2.2 Breeding islands of Black-footed and Laysan Albatrosses. From Arata *et al.* 2009.

The albatross breeding season, particularly the early part of the year when birds have small chicks, coincides with the greatest amount of fishing effort and take of birds by the fishery. During the breeding season, Laysan and Black-footed Albatrosses forage in quite different oceanographic areas. Laysan Albatrosses generally travel farther north and farther west of the colony than Black-footed Albatrosses, which typically travel between Hawaii and the continental shelf off the West Coast of the mainland U.S. (Figure 1). During incubation, foraging trips lasted from 10 to 32 days and ranged far from the breeding islands to subarctic waters; in contrast, while brooding young chicks adults stayed away for only 1–3 days, and generally stayed within 500 km of the islands (BirdLife International, 2004c). This is within the general area where take of albatrosses in the fishery is concentrated (Appendix 1 [Figure 16]). During the post-guard stage (after brooding but before chick independence), breeding adults increased the duration and distance of their trips once again to 14.5 days (median) and 2,675 km (maximum), mixing short (<4 days) with long (12–29 days) trips north of the colony, over transitional (12°–15°C) and subarctic waters (less than 10°C) of the Gulf of Alaska and the Aleutian Islands (Hyrenbach *et al.* 2002).

Similar to Laysan Albatrosses, breeding Black-footed Albatrosses make both short and long trips depending on the nest stage. As with Laysan Albatrosses, it is the period during brooding, when most foraging trips have a median duration of 2 days and a maximum distance of 303 km, when most of the interactions with the fishery occur. During a year of low breeding success (1998–99), foraging trips during brooding were longer and primarily directed to waters distant from North America (Fernández *et al.* 2001).

After breeding, Laysan Albatrosses from Hawaii move into the northern and western Pacific, with some consistent distributional differences among colonies (Young *et al.* 2009). During the summer (non-breeding season), adult Laysan Albatrosses primarily are observed around the Aleutian Islands and the western Gulf of Alaska (Robbins and Rice 1974, McDermond and Morgan 1993, Melvin *et al*. 2004). Birds younger than 2 years are observed off eastern Japan, and gradually shift their range east-northeast (Fisher and Fisher 1972, Robbins and Rice 1974). Few Laysan Albatrosses occur in the California Current System (Miller 1940, Thompson 1951, Fisher and Fisher 1972, Briggs *et al*. 1987, Briggs *et al*. 1992). Laysan Albatrosses generally are observed over, and seaward of, the continental slope over areas of strong, persistent upwelling, and along the boundaries of different water masses (McDermond and Morgan 1993), such as the North Pacific Subtropical Convergence (Wahl *et al* 1989).

Black-footed Albatrosses forage in the eastern North Pacific Ocean more than Laysan Albatrosses (Fig. 1). During the summer, adults occur from the continental shelf off North America across the Pacific in a broad band that attenuates northeast of Japan (Robbins and Rice 1974; Fig. 1). The density of Black-footed Albatrosses is high over the cold waters of the California Current, as far south as Point Conception and the Channel Islands (Miller 1936, 1940), and their abundance drops outside the influence of the California Current (Miller 1940, Thompson 1951). In the northern part of their range, Black-footed Albatrosses reach the Gulf of Alaska and the Aleutian Islands in summer, where their range overlaps with Laysan Albatrosses. Black-footed Albatrosses are most abundant over shelf breaks and along the boundaries of water masses (Wahl *et al.* 1989, McDermond and Morgan 1993).

2.1.1.1 Legal Status

In the United States both albatross species are protected by the Migratory Bird Treaty Act (16 USC 703-712). This act implements the international conventions between the United States and Canada, Mexico, Japan, and Russia. The MBTA currently protects 1,007 species, nearly all of the bird species native to the United States. The Service recently determined that listing the Black-footed Albatrosses was not warranted for listing under the Endangered Species Act (ESA) in a finding in response to a petition to list the species (Service 2011a).

The Black-footed Albatross is listed as a Bird of Conservation Concern at national and USFWS Regional (1, 7, and 8) levels, and in Bird Conservation Regions (BCRs) 1, 5, 32, 67 (Hawaii) and Other U.S. Pacific Islands. The Laysan Albatross is also a Bird of Conservation Concern in USFWS Region 7, and in BCRs 1, 5, 67, and Other U.S. Pacific Islands (Service 2008). The Black-footed Albatross is listed as threatened by the State of Hawaii (Mitchell *et al.* 2005). The IUCN listed the Black-footed Albatross as Endangered and the Laysan Albatross as Vulnerable in 2003 in response to the threat posed by longline fisheries in the North Pacific (IUCN 2004).

2.1.1.2 Population Status

During the last century, these species have been subject to high rates of mortality and disturbance at both the breeding colonies and foraging grounds (Cousins and Cooper 2000, Tickell 2000, Lewison and Crowder 2003). Populations were greatly reduced, and Laysan and Black-footed Albatrosses were extirpated from many breeding islands by feather hunters during the late 19th and early 20th centuries (Rice and Kenyon 1962, Spennemann 1998, Tickell 2000). The largest source of mortality of breeding adults currently is fishery bycatch (Arata *et al.* 2009).

The population estimate for Laysan Albatrosses in 2010 was about 656,310 pairs, a major increase from an estimated 18,000 pairs in 1923 (Arata *et al.* 2009; Service *in litt.* 2011). The increase over 80 years is directly related to the cessation of feather hunting in that year, the cessation of persecution by the military, and the increased availability of nesting area on some islands. The total estimated annual loss of Laysan Albatross from bycatch in 2005 was 2,500 birds, essentially steady since the late-1990's, and less than one-tenth of the estimated rate in the late 1980's (Arata et al. 2009). Regardless, the sum of breeding pairs on nesting islands has steadily increased from 1995 to 2005 at an estimated 6.7 percent per year (Arata et al. 2009). Thus for Laysan Albatross, bycatch is well below that which would affect population viability.

The breeding population of Black-footed Albatrosses increased from an estimated 18,000 to 66,621 pairs between 1923 and 2010 (Arata *et al.* 2009, Service *in litt.*, 2011). In contrast to the Laysan Albatross, the Black-footed Albatross might be at risk of decline due to fishery bycatch. An analysis of population trends showed essentially a stable population since at least 1998, and perhaps since 1957 (Arata *et al.* 2009). Models suggest that the Black-footed Albatross population across the same islands is stable, or slightly increasing, with a population growth rate of 0.3 percent per year. However, Arata et al. (2009) cautious estimate of annual take in fisheries for this species (doubling the 2005 estimate of 5,228 birds per year to account for observer bias), yielded an estimate approaching the limit of take that the current population of Black-footed Albatrosses could sustain without experiencing a population decline.

2.1.1.3 Threats

Threats to Laysan and Black-footed Albatrosses include interactions with commercial fishing operations (bycatch), contaminants, and plastic ingestion. Invasive species (predators, plants, and invertebrates), habitat degradation, contaminants, and human disturbance threaten birds at nesting colonies. Global climate change potentially threatens both species at sea and on their breeding grounds. The most significant of these threats are discussed below (for detailed analyses see Arata *et al.* 2009, Service 2011a).

Arata et al. (2009) analyzed bycatch data collected through 2005 for three fisheries that operate in the range of these two species; they concluded that the combined take on each species, when compared to estimates of mortality that the current populations of albatrosses might sustain without causing population declines, was not causing population declines for the Laysan Albatross. Arata et al. (2009) also concluded, again using data collected through 2005, and using conservative estimates of bycatch, that take of Black-footed Albatrosses by fisheries might be high enough to affect population trends (Arata et al. 2009). The data analyzed were from the high seas driftnet, Alaskan and Canadian demersal longline, and U.S. pelagic longline fisheries (see Arata et al. 2009 and NOAA 2011 for a full description of those fisheries). Other longline fisheries operate within the range of these species—for example a groundfish fishery along the west coast and international longline vessels from several nations—but Arata et al. did not have bycatch data sufficient for analysis (Arata et al. 2009).

Further analysis of the influence of fisheries bycatch on population trends of Black-footed Albatross (Service 2011a) considered data collected through 2010 and concluded that conservation measures implemented in fisheries to reduce bycatch of Black-footed Albatross "thus far have been highly effective" (Service 2011a). Regarding specific fisheries, the analysis also concludes that "Black-footed Albatross is not significantly threatened by the inadequacy of regulatory mechanisms related to the Hawaii-based shallow-set longline fishery; the Alaska-based demersal longline groundfish fishery; and the California, Oregon, and Washington groundfish, Pacific hake, and pelagic longline fisheries throughout its range." However, data were lacking for other fisheries that operate within the range of this species, for example the Alaska-based demersal longline fisheries; other (nonpelagic) longline fisheries based in California, Oregon, and Washington; coastal purse seine and troll fisheries based in the United States; Canadian-based longline fisheries; and longline fisheries based in Japan, Taiwan, China, Korea, Russia, and Mexico. Ultimately, a slowly increasing population in the face of bycatch from these fisheries is evidence that these fisheries, as currently operated, are not causing a population decline in Black-footed Albatrosses.

Laysan Albatross chicks on Midway Atoll ingest small bits of lead-based paint that has peeled off old buildings; up to 10,000 chicks per year contain lethal levels from this exposure, 2 to 3 percent of the average number of chicks hatched (as cited in Arata et al. 2009). In 2005 the USFWS began remediation of several buildings to reduce lead exposure, and in 2010 undertook a review of the current threat and methods to further reduce lead on Midway Atoll (Service 2011b). These efforts are expected to substantially reduce lead contamination in albatross chicks in the future.

Adult albatross foraging for their chicks ingest floating bits of plastic garbage and then feed this to their chicks. Indigestible material such as plastics accumulates in the upper stomach of chicks and is usually regurgitated before fledging. Mortality from plastic ingestion was not considered to be a significant cause of death in albatross chicks (Sievert and Sileo 1993), and a direct link between plastic ingestion and mortality has not been established.

Climate change is a threat to breeding and foraging albatrosses. The impacts of climate change may result in long-term changes to the breeding and foraging habitat required by North Pacific albatrosses. In marine systems, the two primary responses to climate change are increased ocean temperature and absorption of atmospheric CO_2 (IPCC 2007). Increases in temperature lead to increased stratification of the water column and decreased subsurface oxygen, which can affect biological productivity (Behrenfeld *et al.* 2006, Polovina *et al.* 2008); alteration of ocean circulation and wind patterns, which can affect distribution of primary producers and other species; and sea-level rise, which can inundate coastal or low-lying breeding habitat for seabirds (Baker *et al.* 2006, Cazenave and Llovel 2010). Warmer sea-surface temperatures may also increase the frequency and severity of storms (Bender *et al.* 2010).

2.2 Other Seabirds

Three other species merit mention here either because of risk of or reported take in the fishery.

2.2.1 Short-tailed Albatross

This species is about 30 percent larger than either the Black-footed or Laysan Albatross with a body length of 33-37 inches (84-94 cm) and a wingspan of 84-90 inches (213-229 cm). The Short-tailed Albatross probably was once the most abundant albatross in the North Pacific with 14 breeding colonies in the northwestern Pacific. However, from the late 1800s, millions were hunted for feathers, oil, and fertilizer (Service 2004, 2008), and by 1949, no birds were breeding and the species was thought to be extinct. The species began to recover during the 1950s, and currently the population is growing at a rate of about 7.3% annually (Naughton *et al*. 2007) owing to habitat management and protection, measures to reduce interactions with fisheries, and bird-handling techniques to increase survival. The Short-tailed Albatross was listed as an endangered foreign species under the precursor to the ESA (35 FR 8495; June 2, 1970). The listing was later modified to clarify that endangered status applied in the U.S. as well (July 31, 2000; 65 FR 46643).

Today, two small colonies exist in the western Pacific on small Japanese islands (USFWS 2004). The largest colony, at Tsubamezaki on Torishima Island, is estimated to contain 80-85% of the existing breeding population. Following the 2010-2011 breeding season, the population size on Torishima was estimated at 2,750 birds (H. Hasegawa, Toho University, *in litt.* 2011). A translocation project was initiated in 2008 to reestablish breeding at a former colony site on Mukojima, a non-volcanic island south of Torishima, in the Ogasawara Islands. This project has been highly successful; and although no pairs have bred yet on Mukojima, at least seven birds fledged from the island have returned subsequently (Yamashina Institute for Ornithology *in litt.* 2011). A smaller breeding colony exists off Taiwan in the Senkaku Islands and in 2002 was estimated to be 260 birds by Dr. Hasegawa (NMFS 2002). Significantly, a pair bred successfully on Midway Atoll in 2010; this pair was observed incubating an egg in November 2011 (P. Leary, Midway Atoll National Wildlife Refuge, pers. comm. 2011).

No Short-tailed Albatrosses have been reported taken by the Hawaii-based longline fishery. However, the species is sighted from Hawaii-based longline vessels (NMFS 2011), and has been taken in other North Pacific longline fisheries. The number of individuals that spend the breeding season in the Northwestern Hawaiian Islands, albeit very small, is increasing (Service, unpublished data). If the breeding population becomes established in the Northwestern Hawaiian Islands, the potential for take by this fishery is likely to increase. The analysis for the effects of this fishery on the Short-tailed Albatross is currently in progress as part of formal consultation under the Endangered Species Act. The results of that consultation will be incorporated in the final environmental assessment and our permit decision.

2.2.2 Sooty Shearwater and Northern Fulmar

The Sooty Shearwater breeds on islands in the Southern Hemisphere (New Zealand, Australia, and Chile in the Pacific, and the Falkland Islands in the Atlantic), but migrates to the Northern Hemisphere in the boreal spring. While in the North Pacific, Sooty Shearwaters concentrate in “hotspots” near California, Alaska, and Japan (Shaffer *et al.* 2006), and so only overlap with the Hawaii-based fishery while in transit between hemispheres (in roughly April and October).

Although Sooty Shearwaters are among the most abundant seabirds on Earth, their population is suspected to be in decline (Brooke 2004). Threats to Sooty Shearwaters include harvest of chicks for food, predation by non-natives rats, mortality in Southern Hemisphere longline fisheries, and possibly climate-change effects (BirdLife International 2011). One Sooty Shearwater has been reported taken in the fishery since 2004.

The Northern Fulmar is one of the most abundant seabirds in the Northern Hemisphere. In the Pacific, they breed principally in four large colonies on islands in Alaska (Hatch and Nettleship 1998). Although Northern Fulmars may range from the Bering Sea and Gulf of Alaska as far south as Japan and Baja California, typically these movements are confined to productive waters border continents (Harrison 1991). This species is therefore not common in the mid-ocean pelagic seas where the Hawaii-based shallow-set fishery operates. One Northern Fulmar has been reported taken in the fishery since 2004.

2.3 The Hawaii-based Shallow-set Longline Fishery

Pelagic longlining is a commercial fishing method that involves the deployment of thousands of baited hooks set in the water column. Pelagic longlining primarily targets tunas and billfishes of the open seas (Brothers *et al.* 1999). Albatrosses are surface-scavenging seabirds that have a well-developed sense of smell. These birds are attracted to fishing vessels, where they may pursue baited hooks and feed on fish offal and spent baits discarded overboard.

The Hawaii-based pelagic longline fleet operates from the equator to roughly 50°N latitude and between 135°W and 180°W longitude, with the highest fishing effort near the Hawaiian Archipelago (as described above; also see Appendix 1 [Figure 9]). The highest incidence of interactions with albatrosses occurs between 25° and 35°N and between 140° and 175°W (Appendix [Figures 10-16]).

The longline fisheries are currently managed under the Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region (Pelagic FEP) developed by the Western Pacific Fishery Management Council (WPFMC) and approved by the Secretary of Commerce. The Hawaii longline fleet grew from 37 vessels in 1987 to 138 vessels in 1991 through the influx of longline vessels from the East Coast and Gulf of Mexico looking to target swordfish (NMFS 2007). Since 1994, the fisheries have been limited to 164 vessels (59 FR 26979), with about 120-130 active vessels (deep- and shallow-set) in any given year since then.

3: Alternatives to the Proposed Action

We evaluate three alternatives in this DEA: a “no action” alternative and two action alternatives. We consider these to represent a reasonable range of possible responses to the permit application from NMFS. One additional alternative is considered but excluded from further analysis.

3.1 Description of the Alternatives

1. *No action.* Under the No Action alternative, we deny the permit application and do not issue a permit to NMFS. We rejected consideration of a separate alternative of literally taking no action, and not even responding to the permit application because it is our policy to process applications as quickly as possible (50 CFR 13.11(c)).

2. *Issue permit as requested.* The permit reflects the current operation of the fishery, including the seabird-deterrent measures currently required by NMFS regulations, with no changes, regulatory or otherwise, to the operation of the fishery during the permit period. Under this alternative, all existing regulations for the shallow-set fishery would remain effective. NMFS would not be required to collect new data or otherwise expend additional resources, and no new regulations governing the operation of the fishery would be proposed. The permit application included the following commitments aimed at possible future reductions in take that would be included as permit conditions. These permit conditions would require NMFS to:

    A. Analyze the high proportion (50-80 percent each year) of the total observed take in this fishery that occurs as injured birds, birds presumably taken during retrieval of longline gear. Specifically, NMFS would examine the role of untended or “lazy” lines, offal discards, and other practices in making hooks and gear available to seabirds and possibly attracting and habituating seabirds to longline vessels, especially during gear retrieval. To do this, NMFS would:
    i. analyze existing and future observer data;
    ii. emphasize the importance of seabird data collection to observers, and modify observer debriefing to elicit additional information on this topic; and
    iii. provide opportunities at Protected Species Workshops for fishers to specifically discuss how and when seabird interactions occur during shallow-set fishing.

    B. Report the results of these activities each year in NMFS’s Annual Report, “Seabird Interactions and Mitigation Efforts in the Hawaii Longline Fisheries,” including new insights that could further reduce the take of seabirds in the fishery or point to research needed to achieve reduction. Annual reports of the year’s activities would be due to the Service before October 1 of the following year. In responding to any request for a permit renewal, the Service would consider progress by NMFS toward identifying remedies for take. However, incorporation of these remedies into NMFS regulatory processes would not need to occur during the period of the initial permit.

    C. If analyses, qualitative assessments, and other information do not lead to identification of modified or new practices that could reduce take of migratory birds in the fishery, NMFS would provide in their report study plans for needed research, and/or a proposal or proposals for how the unavoidable take in the fishery might be offset or compensated in a manner that would not hamper operation of the fishery. This might include contribution to conservation projects that benefit North Pacific albatrosses, or another proposal of NMFS's devising. NMFS would work with the Service to develop proposals for offsets or compensation into actions in a timely fashion. (Proposals for offsets or compensation would not need to be implemented during the period of the permit, but the Service would consider progress toward this goal in responding to any request for a permit renewal.)

3. *Issue permit with additional conditions to conduct research and to increase conservation benefit to seabirds.* Permit conditions include the seabird-deterrent measures currently required by NMFS regulations. Additional permit conditions would require NMFS to:
   A. Develop proposed methods for continued reduction of seabird take in the fishery by funding and conducting new research and field trials in collaboration with established experts in seabird-bycatch avoidance. Research and trials would determine the feasibility and efficacy of seabird-deterrent practices and technologies including some not currently used in the shallow-set fishery but used elsewhere in the industry, including but not limited to:
      i. streamer or "brickle" curtains during haulback to prevent seabird access to untended or "lazy" lines;
      ii. modification or cessation of offal discards; and
      iii. any other practices or technologies indicated by current accepted practices in the industry.

   B. Analyze seabird take south of 23º N latitude, the southern limit on the implementation of seabird-deterrent measures.

   C. Report each year the results of research and trials conducted in NMFS's Annual Report, "Seabird Interactions and Mitigation Efforts in the Hawaii Longline Fisheries." Identify in that report which, if any, measures and technologies are likely to result in reduction of take. These annual reports would be due to the Service before October 1 of the following year.

   D. Similar to Alt 2.D., above: If new analyses, qualitative assessments, and other information do not lead to identification of modified or new practices that could reduce take of migratory birds in the fishery, NMFS would provide in their report a proposal or proposals for how the unavoidable take in the fishery might be offset or compensated in a manner that would not affect operation of the fishery. This might include other new research on seabird-avoidance measures, contribution to conservation projects that benefit North Pacific albatrosses, or some other proposal yet to be devised. NMFS would work with the Service to develop proposals for offsets or compensation into actions in a timely fashion. (Proposals for new or modified deterrent practices or for offsets or compensation would not need to be implemented during the period of the permit, but the Service would consider progress toward this goal in responding to any request for a permit renewal.)

3.2 Alternative considered but excluded from analysis

Issue permit with additional conditions to implement means to reduce take and increase conservation benefit. Same as Alternative 3, with additional permit conditions that would require NMFS to initiate steps necessary to:

A. implement any new or modified practices or technologies revealed by research and trials to be likely to further reduce seabird take;
B. remove the southerly limit (23º N latitude) on the use of seabird deterrents in the fishery; and
C. implement any offsets or compensatory mitigation identified in Alt 3.D within the three-year term of the permit. If needed to accomplish this, NMFS would work with the Western Pacific Regional Fisheries Management Council to initiate a regulatory amendment process and complete rule-making.

This alternative was excluded from further analysis because requiring NMFS to issue regulations that affect the operation of the fishery would necessitate that the Fishery Council initiate a regulatory amendment to the fishery management plan, as required by the Magnuson-Stevens Act. Requiring NMFS to seek a regulatory amendment from the Fishery Council is not practicable at this time as data is lacking to support such a requirement.

4: Environmental Consequences

In this section we assess the impacts of the alternatives on relevant aspects of the environment and the significance of these impacts as defined in the Council on Environmental Quality (CEQ) regulations (40 CFR 1508.27). Below we provide information about potential direct and indirect impacts of each of the alternatives on (1) the seabirds of primary interest, Laysan and Black-footed albatrosses, and (2) the fishery and economic environment. In analyzing the significance of the impacts, we consider the context and intensity of the impacts. The context of our evaluation includes effects both at the scale of the birds and sites directly affected by the fishery and at the scale of species conservation; we have also considered short- and long-term effects. In evaluating the intensity of the impacts, we consider each of the issues listed in the CEQ regulations, and in particular assess the cumulative impacts of these alternatives in the context of past, ongoing, and likely future actions, events, and processes.

4.1 Impacts to Seabirds

4.1.1 Impacts Common to All Alternatives

In the near-term, direct impacts to seabirds are the same for all of the permitting alternatives described in section 3.1. None of the alternatives would result in any changes to the operation of the fishery or in *immediate* conservation benefits provided to seabirds by NMFS. The differences among the alternatives lie in (1) the degree to which proposed permitting conditions under Alternatives 2 and 3 are expected to improve awareness of and information about seabird take in the fishery, and (2) variations among the alternatives in the development of proposed remedies for this take and/or proposed offsets or compensation for any take that proves unavoidable. Direct impacts to seabirds, as they occur now, therefore constitute the amount of anticipated take that would be authorized under Alternatives 2 and 3. The amount and nature of this take is described below.

In our analysis of the alternatives we assume that regulations issued by NMFS in 2002, 2004, and 2005 specifying the use of seabird deterrents in the Hawaii-based longline fishery remain in effect (these regulations are summarized in Table 4.1). These regulations reflect the terms and conditions of the Service's biological opinion issued under ESA Section 7(a)(2) for the effects of the Hawaii-based longline fishery on the Short-tailed Albatross (USFWS 2000, 2002, 2004). Because these regulations have been in effect since the shallow-set fishery reopened in 2004, we use data reported by the NMFS-PIRO Observer Program to estimate the impacts to seabirds now (Table 4.2).[5]

Take of seabirds in the fishery

Numerous species of seabirds have been observed from Hawaii-based longline vessels (Appendix 1). Of these, however, only five species have been, or run significant risk of being,

[5] The only change to these regulations since the shallow-set fishery reopened in 2004 was the addition in 2005 of regulations describing side-setting and instituting this as an optional seabird-deterrent measure in the whole (deep- as well as shallow-set) Hawaii-based longline fishery. Because shallow-set fishing effort in 2004 was minimal, and because at most only two shallow-set vessels have elected to side-set in any one year since the 2005 regulations were issued, we deem that any beneficial effects of the 2005 regulatory change, and of side-setting, on seabird take have been negligible for the shallow-set fishery.

injured or killed in the fishery as it has operated since 2004. These are the Laysan, Black-footed, and Short-tailed Albatrosses, Northern Fulmar, and Sooty Shearwater. NMFS Observer Program data indicate that 99 percent of all seabird take in this fishery is comprised of Laysan and Black-footed Albatrosses (Table 4.3). The estimated take of the endangered Short-tailed Albatross is described in detail in the Biological Assessment issued by NMFS on the continued operation of the Hawaii-based longline fishery (NMFS 2011). The Sooty Shearwater and Northern Fulmar, the other two species observed to be taken in the fishery, are not considered in depth here. One individual of each species has been taken since 2004, and neither species is frequently observed in the vicinity of shallow-set vessels. We have insufficient information with which to assess impacts of this fishery to these species in detail, but based on these numbers, we assume the effect to the human environment by our permitting, or not, the take of these two species by this fishery is minimal.

Based on NMFS Observer Program data collected from 2004 through 2010, we estimate that an average of 55 Laysan and 20 Black-footed Albatrosses are taken each year in the shallow-set fishery. We averaged the total estimated take over the five complete or representative years of fishing during this period: 2005 and 2007 through 2010.[6] We excluded 2004 because the fishery was reopened late in the year, and thus was not representative of a complete fishing year. We excluded 2006 because the fishery was closed early when the take of sea turtles reached a hard cap set by regulations. In these five years, the estimated numbers of birds taken ranged from 41 to 86 Laysan and seven to 42 Black-footed Albatrosses (Table 4.2).

Although the fishery has 100-percent observer coverage (meaning that NMFS places a trained fishery observer on every vessel to perform a range of duties from measuring and tagging fish to recording bycatch and interactions with protected species), the average annual take is an estimate because of uncertainty in the total number of birds caught during gear setting. The carcasses of birds hooked or entangled during the set may not all be hauled aboard and counted during gear retrieval (typically, the next morning). Studies in which seabird interactions were closely observed during daytime gear setting indicated that a significant proportion (from 27 to 45 percent) of the birds observed to be caught were not recovered as carcasses during gear retrieval (Brothers 1991, Gales *et al.* 1998, Gilman *et al.* 2003). The loss of carcasses was ascribed to scavenging by marine predators or carcasses dropping off the gear while it was in the water (overnight in most cases). Data on drop-off rates were collected during experiments conducted in Hawaii in 2002 and 2003 to test the efficacy of underwater line chutes and side setting as seabird deterrents. Gilman *et al.* (2002, 2003b) found that 34% and 28% of birds observed to be hooked during the set in 2002 and 2003, respectively, were not found on the line when the gear was hauled in. For the purpose of calculating take in subsequent Biological Opinions, the Service has taken the average of these two results, and assumed a drop-off rate of 31% of birds taken during gear setting in the Hawaii-based longline fishery (USFWS 2000, 2002, 2004).[7] Data on seabird take are reported by the Observer Program as birds either injured or dead (see Appendix 2, which includes samples of Observer Program quarterly and annual reports). In Table 4.2, we add 31

[6] By the time we finalize this draft EA, we may have complete data for 2011 from NMFS to add to our analysis.
[7] The endangered Short-tailed Albatross has been observed numerous times from Hawaii-based longline vessels but no take of this species has ever been reported from this fishery. Therefore the Service has used documented take of the Black-footed Albatross as a proxy for take estimation of Short-tailed Albatrosses in ESA Section 7 consultation.

percent to the subset of total take recorded as dead birds; we assume conservatively that all of these birds were taken during gear setting.

Inspecting the two categories (dead and injured) separately indicates that a high proportion (72 and 61 percent of all Laysan and Black-footed Albatrosses, respectively) of the total number of birds taken is in the form of injured birds (Table 4.2). Owing to the very low likelihood that birds caught during the set survive to be brought aboard alive the next morning, these birds are likely to be taken during gear haulback (NMFS 2011). In contrast with take that occurs during gear setting, seabird interactions during haulback occur in daylight and in close proximity to the vessel, and the interval is likely brief between birds becoming hooked or entangled and being hauled aboard. Consequently, we assume that the observed numbers of injured birds is reasonably accurate, although some injured birds may be pulled or cut from lines before observers see them (see below).

Gear haulback occurs in daylight and may involve increased exposure of seabirds to fishing lines and baited hooks. Although the mechanisms underlying take during haulback have not been examined, NMFS (2011) posits that this may result from “lazy lines,” branchlines without fish that are unclipped from the mainline as gear is retrieved and hung from the side of the vessel. These branchlines, often carrying baited hooks, skip along the surface behind the vessel and are left untended until deck crew are free to retrieve them. In addition, the use of spent baits and offal from processed fish tends to attract any seabirds present to the side of the vessel opposite where gear is hauled (“strategic offal discards”) and may function as a means of attracting and habituating seabirds to the fishing vessels (NMFS *in litt*., 2011).

With respect to extent of impacts to migratory birds, we make no distinction between birds injured and killed during interactions with the fishery. Although birds taken as injured are released alive, and NMFS regulations include seabird handling techniques designed to maximize the survival of birds released alive, any injury that impairs a bird’s ability to thermoregulate, fly, or forage is likely to result in death (*e.g.*, Weimerskirch and Jouventin 1987). NMFS Observer Program reports do not include data on the types or extent of injuries sustained by birds released alive, and no means exist currently to determine the survival rate of birds released injured. Therefore we assume all injured birds eventually die as a result of their injuries.

The actual number of birds taken may be higher than the estimates presented in Table 4.2, because all birds remaining on lines may not be hauled aboard and documented. Instead, some birds may be flicked or cut from lines by deck crew before they are seen by fishery observers (Gales *et al.* 1998, Gilman *et al.* 2005). Because observers are engaged in processing fish as they are brought aboard, they do not observe the branchlines as they are hauled from the water. Owing to such biases in observer data, Arata *et al.* (2009) doubled their estimates of take. We have no means of determining whether and to what extent bird taken are missed by observers in this fishery, and we include no correction factor for this in our estimates of birds taken in the fishery.

In addition to the direct, observed take of seabirds described above and in Table 4.2, two other forms of take of seabirds would continue to occur as a result of the fishery under any of the alternatives. First, take of adult albatrosses between January and June, during chick-rearing, would continue to result in an unrecorded amount of chick mortality when a parent is lost (Fisher 1975). Mortality and injury of seabirds in the fishery is concentrated during this part of the year, which is when 72 to 90 percent of the shallow-set fishing effort takes place (Appendix 1).

Second, longline gear lost at sea could continue to result in unrecorded injury or death of additional seabirds. We have no data that allow for quantification of this possibility, but the presence of derelict fishing gear in the North Pacific, including monofilament line, and entanglement of seabirds and other marine vertebrates in such gear is a well-documented phenomenon (*e.g.*, Hanni and Pyle 2000, Donohue *et al.* 2001, Moore *et al.* 2009).

Table 4.1 Under regulations issued by NMFS (2002, 2004, 2005b), all vessels in the Hawaii-based shallow-set longline fishery are required to use one of these two suites of seabird-deterrent measures when fishing north of 23º N latitude (from NMFS permit application; Appendix 1).

Seabird Mitigation Measure	Stern-Setting	Side-Setting
Begin set at least 1 hr after local sunset & complete no later than 1 hr before sunrise*	X	
Use thawed and blue-dyed bait	X	
Maintain at least two (2) - one lb containers of blue dye on board the vessel at all times	X	
Discard offal opposite side of the vessel from where the longline gear is being set or hauled (when birds are present); retain sufficient quantities of offal; remove all hooks from offal	X	
When using basket-style longline gear north of 23° N. lat., ensure that the main longline is deployed slack to maximize its sink rate	X	
Branchlines must have weights that are a minimum 45 g (1.6 oz) within 1 m (3.3 ft) of the hook		X
Set from port or starboard side		X
Place setting station at least 1 m (3.3 ft) forward from the stern of the vessel		X
Place line shooter at least 1 m (3.3 ft) forward from the stern of the vessel (if used)		X
Deploy gear so that hooks do not resurface		X
Use bird curtain with required specifications		X
Follow all seabird handling procedures	X	X

*Setting of longline gear should be conducted under minimum deck lighting and in conformance with navigation rules and best safety practices.

The absolute numbers of seabirds taken in the shallow-set fishery each year are low (Table 4.2), particularly when considered in the context of the total breeding populations of the species taken, which range from roughly 67,000 pairs for Black-footed Albatross to as many as 30 million pairs for the Northern Fulmar (Table 4.3). Analyses in a recent status assessment of the Laysan and Black-footed Albatrosses (USGS 2009) and two Biological Opinions on the effects of the fishery to the Short-tailed Albatross (USFWS 2000, 2004), and the Biological Assessment prepared by NMFS (NMFS 2011), indicate that take occurring (or likely to occur, in the case of the endangered Short-tailed Albatross) in this fishery by itself does not have population-level impacts, and will not change the conservation status for any of these species in the near term. Therefore the direct impacts of our alternatives alone would not rise to the level of significance under NEPA.

Table 4.2 Observed and estimated take of Laysan and Black-footed Albatrosses in the Hawaii-based shallow-set longline fishery, 2004 to 2010. Data from NMFS-PIRO Observer Program Quarterly Reports (NMFS unpublished data, 2004-2010). Take observed as dead birds is assumed to occur primarily during gear setting, which occurs at night, and is adjusted by a factor of 0.31 to account for birds hooked during the set that either drop off or are taken by other predators while the gear is soaking (Gilman *et al.* 2002, 2003b).

A. LAYSAN ALBATROSS (LAAL)

YEAR	DEAD LAAL (Observed)	TOTAL DEAD (Estimated; add 31% drop-off)	**INJURED LAAL (Observed)**	TOTAL LAAL (Estimated)	**PERCENT INJURED OF EST. TOTAL**	NO. HOOKS SET	RATE/ 1,000 HOOKS
2004			**1**	1	**1**	115,718	0.009
2005	18	24	**44**	68	**0.651**	1,358,247	0.05
2006*	3	4	**5**	9	**0.56**	676,716	0.013
2007**	6	8	**33**	41	**0.808**	1,353,761	0.03
2008	11	14	**22**	36	**0.604**	1,460,042	0.025
2009	17	22	**64**	86	**0.742**	1,694,550	0.051
2010	7	9	**33**	42	**0.783**	1,832,471	0.023
2011†	8	10	**38**	48	**0.784**		
TOTAL	70	92	**240**	332	**0.724**		
			MAX LAAL	86			0.051
	5-year average (2005-10, excluding 2006)			55			0.036

B. BLACK-FOOTED ALBATROSS (BFAL)

YEAR	DEAD BFAL (Observed)	TOTAL DEAD (Estimated; add 31% drop-off)	**INJURED BFAL (Observed)**	TOTAL BFAL (Estimated)	**PERCENT INJURED OF EST. TOTAL**	NO. HOOKS SET	RATE/ 1,000 HOOKS
2004					**---**	115,718	---
2005	4	5	**3**	8	**0.364**	1,358,247	0.006
2006*	3	4		4	**0**	676,716	0.006
2007**	2	3	**6**	9	**0.696**	1,353,761	0.006
2008	4	5	**2**	7	**0.276**	1,460,042	0.005
2009	7	9	**22**	31	**0.706**	1,694,550	0.018
2010	11	14	**28**	42	**0.66**	1,832,471	0.023
2011†	4	5	**11**	16	**0.677**		
TOTAL	35	46	**72**	118	**0.611**		
			MAX BFAL	42			0.023
	5-year average (2005-10, excluding 2006)			20			0.012

*fishery closed early because of sea turtle take
**Quarters 1-3 only: Quarter 4 reported with 2008 data due to confidentiality (NMFS 2011).
†Quarters 1 and 2 only; remaining data not available at time of writing.

Table 4.3 Total estimated populations of seabird species taken and ESA-listed species at risk of take in the Hawaii-based shallow-set fishery. Data sources: Service unpublished data 2011 (Laysan and Black-footed Albatrosses); H. Hasegawa, Toho University, Japan, pers. comm. 2011 (Short-tailed Albatross); BirdLife International 2010 (Sooty Shearwater and Northern Fulmar).

SPECIES	ESTIMATED GLOBAL POPULATION (BREEDING PAIRS)	TOTAL TAKE SINCE 2004
Laysan Albatross	656,310	332*
Black-footed Albatross	66,621	118*
Short-tailed Albatross	480	**
Sooty Shearwater	20,000,000	1†
Northern Fulmar	15,000,000 – 30,000,000	1†

*Estimated; see table 4.2.
**No take of Short-tailed Albatrosses has been reported from this fishery. See NMFS 2011 for an estimate of potential take.
†A single individual was observed to be taken between 2004 and 2010.

In Table 4.4 we project the absolute amount of take and the rate per 1,000 hooks that may occur each year over three years (the term of a Special Purpose permit under the MBTA). Inspection of NMFS data on the number of hooks deployed and seabird take indicates that between 2007 and 2010 the effort in the fishery has increased each year (by 7 to 16 percent). Assuming that growth continues, and picking a mid-point, we estimated that fishing effort would increase by 11 percent each year over the next three years. Thus by 2014 the number of hooks set might increase to 2,781,820. We then estimated the number of each species of albatross that might be taken with this amount of fishing effort each year through 2014, using the highest rate of take per 1,000 hooks recorded for each species since 2004 (0.051 birds per 1,000 hooks for Laysan Albatross, recorded in 2009; and 0.023 birds/1,000 hooks for Black-footed Albatross; Table 4.2A and B). In this way, we estimate that by 2014 the potential take could increase to 142 Laysan Albatrosses per year, and to 64 Black-footed Albatrosses per year, (Table 4.4). This analysis assumes a constant rate of take (although different for each species) over time.

Table 4.4 Projected* take of Laysan and Black-footed Albatrosses through 2014

Year	Projected No. of Hooks Set	Maximum Take/Year** LAAL	BFAL
2010	1,832,471		
2011	2,034,043	104	47
2012	2,257,788	115	52
2013	2,506,144	128	58
2014	2,781,820	142	64

* Estimates for Number of Hooks Set assume 11percent increase in fishing effort annually after 2010.
** Rate used to calculate Max Take/Year based on 2009 data for LAAL (0.051 per 1,000 hooks) and 2010 data (0.023 per 1,000 hooks) for BFAL.

Interestingly, an analysis of data supplied by NMFS appears to suggest that the rate of take per 1,000 hooks is correlated with the number of hooks set per year. That is, between 2005 and 2010, the numbers of albatrosses (both species combined) taken per 1,000 hooks deployed rises with the total number of hooks set; the pattern matches an exponential (R^2 = 0.85; Fig. 4.1) better than a linear relationship (R^2 = 0.68). The biological explanation for this apparent relationship is not clear and merits further research. However, the pattern indicates that the rate of take of seabirds is not constant. Predictions of take in the future might account for a rate that varies with fishing effort.

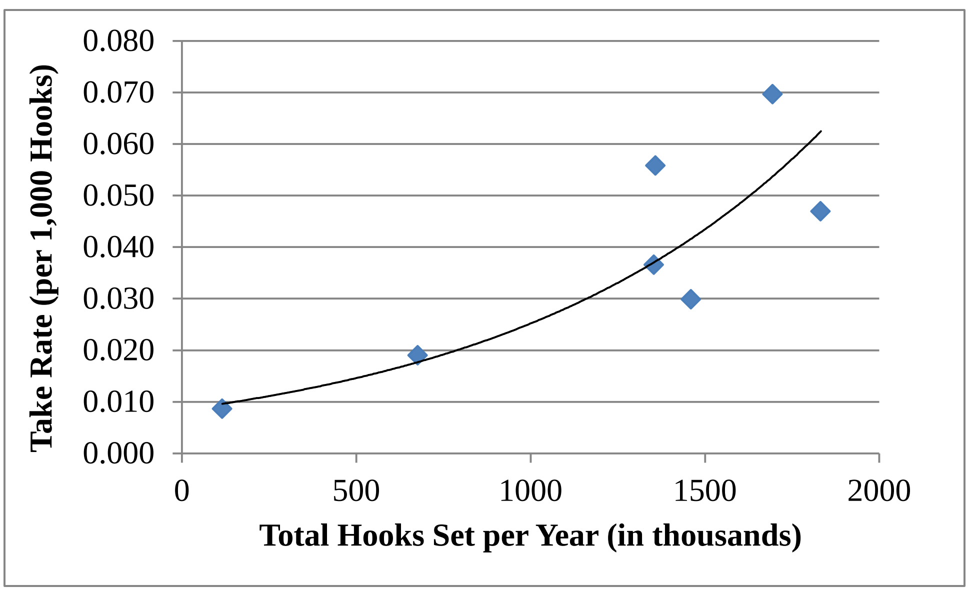

Figure 4.1 Relationship between rate of take of seabirds per 1,000 hooks and total hooks set per year. Exponential growth curve: y=0.085e1E-0.06x; R^2 = 0.85.

However it is calculated, the take of seabirds (injury and mortality) estimated to result from this fishery still falls far below levels that will affect populations of these species in the near term (Arata *et al.* 2009). As well, caution should prevail in using the existing dataset to predict future take; there are relatively few years on which to base predictions, and biases exist in the data collected. It is clear, however, that whatever the relationship between rate of seabird take and fishing effort, the analyses, monitoring, and research suggested in Alternatives 2 and 3 should help shed light on the mechanisms underlying the observed pattern and minimize take over time.

4.1.2 Alternative 1: No action

Under this alternative, the Service would deny the request for a permit submitted by NMFS in accordance with 50 CFR 21.27, Special Purpose Permits. NMFS would not be authorized to take migratory birds incidental to its regulation of the fishery. The existing regulations issued by NMFS that require the use of seabird deterrents (see Table 4.1) would remain in force, as would the southerly limit of 23 degrees North latitude on their use, and no changes would be made. Observer coverage in the fishery would remain at 100 percent, and NMFS would continue to report dead and injured seabirds and all observations of Short-tailed Albatrosses as they do now under the terms and conditions of the Service's biological opinion. To the extent that Alternative 1 may lead to a reduction in fishing effort due to the legal risk associated with NOAA lacking authorization for incidental take, Alternative 1 may lead to a reduction in take of seabirds (and in take of other protected species, such as sea turtles, and target and non-target fish species).

Denial of the permit would result in no changes to the NMFS's management of the fishery or to the conservation benefits provided to seabirds by NMFS. The fishery would continue to result in unpermitted take of federally protected seabirds. Mechanisms underlying take of migratory birds in the fishery now might or might not be examined, and possible remedies or new research questions might or might not be identified or implemented, at the discretion of NMFS.

In general, the direct impacts to seabirds over the next several years would change little from what they are now. The absolute numbers of birds injured or killed per year, and nominal rate (birds per 1,000 hooks) eventually may rise with the anticipated increase in fishing effort (see Table 4.4 and discussion above). These values would not change substantially, nor would the status of these species, between 2010 and 2014.

4.1.3 Alternative 2: Issue permit as requested

The difference between Alternative 1 and Alternative 2 is that NMFS would take steps to examine how and when take is occurring now, possibly identify methods to further reduce take, and develop plans for new research to identify such methods and/or develop proposals to offset or compensate for the seabird take that cannot be practicably avoided. During the three-year term of the permit, impacts to seabirds would remain the same as they are now. However, under this alternative, NMFS would conduct data analyses and obtain additional information from observers and fishers that would improve knowledge of the mechanisms underlying take, particularly during gear haulback. It is possible that remedies to further reduce take would be identified, and if not, that proposals for new research and/or compensation for seabird take would be developed. These changes would represent progress toward greater seabird conservation that would not occur under the No Action alternative. The Service would take this progress into consideration when NMFS applies for renewal of the permit. Therefore, we anticipate that in the long term, take of seabirds likely would be reduced by some degree under this alternative as compared to the Alternative 1. As the results of the data analysis and possible proposals are unknown, it is impossible to quantify this likely reduction.

4.1.4 Alternative 3: Issue permit with additional conditions to conduct research and to increase conservation benefit

Alternative 3 differs from Alternatives 1 and 2 in providing permit conditions that would require NMFS to conduct new research and field trials to develop new or modified seabird-deterrent practices, based on the most current research, existing deterrent measures not currently used in this fishery, and best professional knowledge of seabird avoidance in the industry. The focus of this research would be to address in particular the high proportion of take that occurs as injured birds, presumably during gear haulback. During the three-year term of the permit, impacts to seabirds would remain the same as they are now.[8] However, in contrast with Alternatives 1 and 2, Alternative 3 would result in new empirical data about the efficacy in this fishery of specific seabird-deterrent practices and the impacts to seabirds of the southerly limit in place now on the use of seabird deterrents. This fishery operates south of 23 degrees North latitude, but the data available do not clarify whether and how often seabirds are taken south of that limit, where the use of seabird deterrents is not required. In further contrast with the other alternatives, the permit conditions under Alternative 3 are based on the assumption that new or modified practices to reduce current take can be identified, or ruled out, relatively rapidly based on specific applied research and field trials, and other methods to improve conservation of seabirds by NMFS can be proposed. The result of this alternative would be the development, by the end of the permit period, of specific steps that would reduce take and/or compensate for unavoidable take (whereas Alternative 2 proposes no such specific research and trials). These steps could then be taken under the subsequent (renewed) permit.

4.2 Impacts to the Fishery and the Economic Environment

The Hawaii-based longline fishery is the State's largest commercial fishery in terms of landings and economic value (NMFS 2009b). The shallow-set sector of the longline fishery targets swordfish or mixed species, but the effort in the deep-set sector of the fishery, which targets tuna, remains higher than the effort for swordfish. Fewer than 30 vessels have participated in the shallow-set fishery annually since the closure between 2001 and 2004 due to concerns about sea turtle bycatch (NMFS 2009b). Regulations for the Hawaii-based longline fishery limit vessel length, which effectively limits the length of longlines being set. Furthermore, seabird bycatch mitigation methods under the FMP regulations limit the amount of gear that can be set in one fishing day (NMFS 2009b).

The value of fish sold by the Hawaii-based longline fishery amounts to less than 1% of Gross State Product, and likely a very small percentage of Hawaii's total recreational and commercial fishing-related expenditures (NMFS 2009b). Hawaii's pelagic fisheries are responsible for the largest share of annual commercial landings. For example, in 2007 the domestic longline fishery for tuna, swordfish, and other pelagic species is the largest component of the fishery, landing

[8] If research were conducted on vessels operating in the fishery, field trials of new or modified seabird-deterrent measures could themselves result in an overall reduction of seabird injury and death. However, we have insufficient information about how new research would be designed or carried out to fully analyze this possibility.

24.7 million pounds with a value of $62.7 million (NMFS 2009b). The shallow-set longline fishery contributes a very small percentage of Hawaii's household income and employment (NMFS 2009b).

Alternative 1 (No Action, deny the permit) could result in slightly increased unemployment in the fishing community and related industries if the legal risk associated with NOAA not having authorization for incidental take resulted in a reduction in fishing effort. However, recent unemployment figures for Hawaii in 2007 indicated the lowest unemployment rate in the U.S. (NMFS 2009b) suggesting resiliency to changing employment conditions.

Alternative 2 (issue the permit as requested) may marginally increase costs to NMFS, but would neither affect the cost of fishery operations nor affect economic output. This alternative would not result in any new regulations during the proposed permit term, but would require NMFS to slightly modify observer monitoring and reporting standards, and to analyze and provide reports to the Service on the resulting data.

Alternative 3 (issue the permit with additional conditions) would likely result in moderate cost increases associated with conducting research and, to a lesser degree, operating the fishery, but would not significantly affect the fishery or its economic output. Likely only a small proportion of fishers would be affected by field trials, if these involve vessels in the fishery. Trials could require minor vessel modifications unless vessels with such modifications already exist within the fishery. Alternative 3 might result ultimately in regulations to implement new or modified seabird avoidance measures, and regulatory action would incur costs to NMFS in terms of staff time.

4.3 Impacts to Cultural Resources

<u>Section 106 of the National Historic Preservation Act</u>

The proposed permit action is an undertaking according to Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA). The permitted activities involve the incidental take of migratory birds by the fishery operating in the eastern Pacific Ocean. While the species subject to take might be considered culturally or religiously significant by Native Hawaiian Organizations (NHOs), the take of the species must be shown to potentially affect an historic property for NHPA to apply. Since there is no historic property that could be reasonably identified to exist at the location of the incidental take (the eastern Pacific Ocean), there can be no potential effect on a historic property even if the species subject to the take were considered to be culturally significant. Therefore, and in accordance with 36 CFR 800.3(a)(1) the implementing regulations of the NHPA, the Service has determined that the proposed action is an undertaking with no potential to affect historic properties. Thus, the Service determined that no further consideration of cultural resources, including consultation with NHOs, pursuant to the NHPA, is required.

4.4 Cumulative Impacts

Under NEPA, cumulative impacts are defined as those combined impacts on the human environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what Federal or non-Federal agency or person undertakes such other actions (40 CFR 1508.7).

We considered cumulative impacts of the alternatives when added to the impacts of fisheries generally and other factors past, present, and future that may affect the seabirds of interest. A potential difference between Alternative 1 and the two action alternatives (Alternatives 2 and 3) would be changes in fishing effort and seabird take as a result of legal consequences of NMFS not having authorization for take of migratory birds. A variation among all of the alternatives is the level of information gained through additional monitoring, analyses, and research. It is possible that a long-term consequence of determining specific causes of seabird take in this fishery under Alternatives 2 and 3 could lead to measures that reduce those impacts in other fisheries as well. Other than these differences, and because existing take levels are low relative to population levels and the action alternatives do not immediately alter the take by the fishery, the cumulative impacts are generally similar for all the alternatives.

The halt of the harvest of Black-footed and Laysan Albatrosses for the feather trade in the early 20th century and the closure of the high-seas pelagic driftnet fishery in 1992 both were critical to reversing declines and promoting recovery of these species. However, operation of foreign and other U.S. fisheries result in the taking of seabirds, including Laysan and Black-footed Albatrosses. In a status assessment of these species, Arata *et al.* (2009) estimated total fishery bycatch, including international fisheries, at 2,500 Laysan Albatrosses per year and 5,228 Black-footed Albatrosses in 2005, and they recommended that these estimates be doubled to account for the potential biases in the bycatch data. The resulting mortality estimate was deemed to be under the maximum that can be sustained by a healthy, growing Laysan Albatross population. The mortality estimate for Black-footed Albatross, in contrast, possibly exceeded the limit sustainable by a healthy population; thus the cumulative take of Black-footed Albatrosses in all fisheries may slow population growth or possibly contribute to population declines in this species over the next 60 years (Arata *et al.* 2009).

Population models projecting trends of both species on Laysan Island, Midway Atoll, and French Frigate Shoals (all in the Northwestern Hawaiian Islands), showed a high degree of uncertainty (Arata *et al.* 2009). All colonies had high probabilities of both increasing and decreasing in size over the next 60 years, although in most cases the probability of future increases was greater than the probability of future decreases (Arata *et al.* 2009). Given the increases in population numbers for the albatrosses in recent years, fishery-related losses may be slowing the recovery of populations, but by themselves are not likely to cause a reversal in population trend.

Currently, we are aware of no additional U.S.-based shallow-set longline fisheries approved in the North Pacific. However, U.S.-based deep-set and demersal longline fisheries pose similar risks of entanglement, injury, and mortality to protected seabirds. Most U.S.-based fisheries are required to use deterrent measures to minimize impacts to seabirds. The extent to which international fisheries in the North Pacific implement seabird-deterrent measures is unclear, but international conventions and agreements for bycatch reduction, for example, through Regional Fishery Management Organizations, likely lead to some use of deterrents and reductions in seabird mortality and injury (Gilman 2011).

The Short-tailed Albatross population is growing (H. Hasegawa *in litt.* 2011), and this species ranges widely throughout the North Pacific, overlapping with the operation of commercial fisheries (Suryan *et al.* 2006, Zador *et al.* 2008, NMFS 2011). Consequently, NMFS is likely to continue to consult with the Service under ESA section 7 to assess and minimize impacts of U.S. fisheries to this endangered species. Because all three North Pacific albatross species have similar behaviors and foraging habitats, minimization measures for Short-tailed Albatrosses provide some benefits to Laysan and Black-footed Albatrosses and possibly to other seabird species as well.

Impacts from military activities, natural-gas exploration, oil spills, collisions with aircraft, and ingested plastics and contaminants all have taken albatrosses in the past (Arata *et al.* 2009). The military no longer intentionally kills albatrosses (as it formerly did mostly to keep island runways free of nesting or loafing birds), but infrastructure, contaminants, and invasive species brought to islands via military activities continue to have negative effects on albatrosses. However, the military has increased the land area and nesting habitat on some nesting islands (Arata *et al.* 2009). Chicks at Midway Atoll pick up paint chips flaked from old buildings and succumb to lead poisoning. A large-scale effort to remediate lead on Midway is underway (USFWS 2011b). Levels of persistent organochlorines are rising in albatrosses, particularly in Black-footed Albatross, and could be a growing population threat (Finkelstein *et al.* 2006). These contaminants likely enter the food chain from mainland effluent by agriculture and industry around the Pacific Rim. Eggshell thinning is the most obvious effect of organochlorine contamination, and fewer than 5 percent of Black-footed Albatross eggs were crushed because of thinning (Ludwig *et al.* 1997). Another contaminant, plastics picked up by adults and fed to young, may be affecting fledging success, although this effect is uncertain; young regurgitate indigestible material before fledging, as albatross occasionally do as a matter of course. It is unknown what the cumulative impact on albatross is from these stressors. In the face of current levels of these threats, however, populations of Laysan and Black-footed Albatrosses are increasing (Arata *et al.* 2009)

Climate change and consequent changes to sea-surface temperature and marine chemistry are projected to have severe impacts marine ecosystems (IPCC 2007). Marine species respond to global and regional changes in a variety of ways. Some changing conditions, particularly changes in wind and current patterns and stratification of the water column may result in long-term shifts in the quality and distribution of primary production (Behrenfeld *et al.* 2006, Polovina *et al.* 2008), and of food resources for seabirds. Degradation or redistribution of their foraging habitat may mean that seabirds will expend more energy foraging longer and venturing farther from their nesting colonies (Suryan *et al.* 2008). Coral bleaching and inhibited coral growth could also negatively affect marine communities that support prey species in the most convenient foraging habitats for nesting seabirds. Changes to foraging habitat could have significant negative consequences on reproductive success for albatrosses (Kappes *et al.*, 2010).

The impacts of climate change on seabirds can be exacerbated by the impacts of non-climate stressors, such as limited nesting habitat, non-native predators and pathogens on nesting islands, and chance natural occurrences such as storms and tsunamis. Chief among these impacts is projected sea-level rise, which may result in inundation and beach erosion or deposition, as has been observed in Pacific atolls (Webb and Kench 2010). Sea-level rise will likely lead to more frequent over-wash of nesting islands by waves, and eventually to complete inundation on many islands and atolls used by breeding seabirds; seabirds that nest on higher elevation islands may experience less severe effects from sea-level rise (Clapp and Kridler 1977, Clapp *et al.* 1977, Macdonald *et al.* 1990, Cousins and Cooper 2000, Pitman and Ballance 2002, Baker *et al.* 2006, Arata *et al.* 2009, Webb and Kench 2010, Service 2011a). Seabird breeding sites not affected by sea-level rise will become even more important. Most of these sites will require removal of alien predators and other restoration and management to provide suitable habitat for viable seabird colonies.

In 2011, two massive storms in January and February, and the tsunami generated by the earthquake in Japan in March, created waves that over-washed nesting islands in the Northwestern Hawaiian Islands. These three events resulted in the estimated loss of at least 252,000 Laysan Albatross nests and 30,405 Black-footed Albatross nests (at least 45 and 38 percent, respectively, of the estimated total nests for each species) and the death of a minimum of 2,000 adult and subadult albatrosses of both species (USFWS *in litt.*, 2011). Loss of eggs and chicks on this scale is comparable to breeding failures that occasionally occur at colonies of these species as a result of natural fluctuations in food availability. However, the events of early 2011 illustrate the scale of losses that may be expected more frequently with sea-level rise and increased storm severity due to climate change.

Torishima Island is an active volcano that provides nesting habitat for the majority of the Short-tailed Albatross population and for some 2,150 pairs of Black-footed Albatrosses (in 2003) (Service 2011a). Recent eruptions of Torishima have taken place outside the breeding season, when most birds were at sea; however, eruptions may happen at any time. The evidence from past events suggests that the island's breeding population of Black-footed Albatrosses may survive such an event since at any given time approximately 75 percent of the birds are at sea and, therefore, are likely to be absent at the time of a volcanic eruption or other catastrophic event (Finkelstein *et al.* 2010). While rate of recovery depends upon the timing and severity of the eruption and impacts to albatrosses, based on past events, Torishima's seabirds would ultimately recover from such an event, as has occurred in the past (Service 2011a).

The debris field from the tsunami in Japan in March 2011 is expected to arrive in the NWHI in 2012; owing to uncertainty about how much the debris will have dispersed by then, impacts on seabird breeding habitat is difficult to assess (NOAA 2011). In addition, there is a floating mass of largely plastic debris approximately the size of the state of Texas located roughly between 20°N and 40°N latitude and divided into eastern and western halves connected by the subtropical convergence zone. The eastern patch is located between the Hawaiian Islands and the coast of California; the western patch occurs off the coast of Japan (Young *et al.* 2009). These large gyres of floating plastic garbage result from the slow deposition by currents over time of garbage directly or indirectly entering the Pacific. Although studies suggest numerous potential indirect effects of plastic ingestion, to date no conclusive evidence exists that plastic ingestion by albatrosses is a significant source of mortality or reduces body condition (Service 2011a).

Although the shallow-set fishery may contribute to the amount of marine debris, future voluntary efforts that the Hawaii-based fishery undertakes to reduce gear loss, including participation in derelict-gear retrieval, may offset the potential increase in marine debris impacts to seabirds (Service 2011a).

While considered to be catastrophic and dramatic events, oil spills likely account for only a small proportion of the total annual seabird mortality (Thompson and Hamer 2000) and do not have the long-term population effect of other threats, such as bycatch and marine pollutants (Finkelstein *et al.* 2010). Other occasional sources of mortality, such as airplane strikes, or disease, are infrequent and inconsequential to seabird populations (Arata *et al.* 2009).

The Northwestern Hawaiian Islands are free of rats (*Rattus* spp.), which are known to prey on eggs and chicks of seabirds, but predation remains a serious current and future threat elsewhere. For instance, if albatrosses attempt to relocate to high volcanic islands in Hawaii in response to sea-level rise and inundation of nesting habitat in the NWHI, they will encounter nonnative predators that are currently not a threat to these species, such as mongooses, cats, dogs, pigs, and rats (Naughton *et al.* 2007). In the future, albatrosses may rely on the implementation and success of management efforts to restore habitat and eradicate nonnative predators on other nearby, higher-elevation islands (Naughton *et al.* 2007). Although terrestrial predators remain a significant source of predation on many other islands, predation currently is not thought to cause significant population-level impacts.

Sharks are common around the NWHI; they take about 10 percent of fledgling BFAL on Tern Island in French Frigate Shoals. However, we conclude that shark predation is not apparently having a rangewide population-level impact on albatrosses (Service 2011a).

The Service and the Hawaii Department of Land and Natural Resources have implemented programs to control and eradicate *Verbesina encelioides* (golden crown-beard), the greatest current threat to albatross nesting habitat on Midway Atoll and Kure Atoll (Service 2011a).

In summary, we have evaluated the cumulative impacts of threats acting on protected seabirds, and while these impacts may affect individual seabirds and may reduce overall population growth, we have found no existing studies or models that fully integrate or reliably address uncertainties regarding many of these potential impacts. Therefore, we have no basis to conclude that future populations of protected seabirds will be less robust than they are presently due to the cumulative effects of these multiple threats.

4.5 Summary of Impacts

Taken together, impacts to migratory birds and to the fishery and economic environment do not vary greatly among the three permitting alternatives considered, and none of these impacts are significant. The principal differences among the impacts of the alternatives are changes in awareness of and knowledge about take of migratory birds in the fishery and the potential for developing remedies or offsets for this take. Compared to Alternative 1, Alternatives 2 and 3 would improve information about causes and potential remedies for seabird take in this fishery.

<u>Alternative 1: No Action</u>

Denying the permit would result in continued unpermitted take (injury and mortality) of migratory birds, and no change to the current fishery and economic environment except in the event that lack of authorization leads to decreased fishing (*e.g.*, as a result of legal injunction). Take of seabirds might increase eventually with increasing fishing effort, but would be unlikely to increase in the next several years beyond the range of values observed in the past several years. Therefore take would be unlikely to increase to the level of significance under NEPA.

Alternative 2: Issue permit as requested

Under Alternative 2, direct impacts to migratory birds would remain the same as they are now, with the difference that NMFS would have authorization with regard to these impacts—specified levels of take—resulting from its regulation of the fishery. Retrospective data analyses and collection of qualitative information from observers and fishers conducted by NMFS as part of their proposed action might lead ultimately to a reduction of these impacts or to new research or other seabird conservation activities after the three-year term of the permit. These activities might have minor operational impacts on NMFS in terms of changes to workload, but no economic impacts. Alternative 2 would have no impact on the operation of the fishery or on the fishery's expenditures or revenues.

Alternative 3: Issue permit with additional conditions to conduct specific research during the term of the permit to reduce take and increase conservation

Similar to Alternative 2, Alternative 3 would likely result in no change to the impacts to seabirds under Alternative 1, but would result in NMFS having authorization to take specified levels of of migratory birds incidental to its regulation of the fishery. Within the term of the permit, studies and analyses required under permit conditions would yield specific information about the efficacy and feasibility of new or modified seabird-deterrent practices in the fishery, with potential reduction in impacts to seabirds after the first permit term, assuming that the research conducted and methods tested were appropriate to address the mechanisms of seabird take. Conducting this research would result in some economic impacts to NMFS and possibly impacts to the operation of fishing vessels that participated in field trials or other data collection.

5: Conclusion

Because the number of birds reported taken in the fishery is low and the best available scientific information indicates that Laysan and Black-footed albatross populations are stable or increasing, our analysis indicates that none of the alternatives would lead to significant impacts to the birds during the next three years (the term of a Special Purpose permit). In addition, we deem that the scale and intensity of impacts of these alternatives to other aspects of the environment are similarly minor. Because none of the alternatives would lead to any operational changes in NMFS's management of the fishery during the life of a permit, no change to the amount or type of take occurring now would result from any of the alternatives, nor would there be major changes in the operation of the fishery or resources expended by NMFS in their management of the fishery. In evaluating the intensity of the impacts of each of the alternatives, we considered each of the issues listed in the CEQ regulations (40 CFR 1508.27(b)). In particular, the discussion above directly addresses questions of both adverse and beneficial impacts (issue 1), uncertainty (issue 5), precedent (issue 6), cumulative impacts (issue 7), and effects on ESA-listed species (issue 9). In addition we considered whether the alternatives would be highly controversial (issue 4). Although there has been litigation regarding this fishery in the past, the mere fact of litigation does not make an action highly controversial. Given the low level of impacts to seabirds and the fishery that would result from any of the alternatives, we conclude that the action is not highly controversial. In fact, it would, with respect to NMFS, address what might otherwise be a conflict with the MBTA (issue 10). We determined that the other considerations were of limited relevance to alternatives considered.

As described above, the alternatives differ mainly in the degrees of information to be gained about mechanisms causing the current take in the fishery and means of addressing those causes and/or providing other benefits to seabirds. Based on our analysis of direct, indirect, and cumulative impacts, and as compared to Alternative 1, both Alternatives 2 and 3 would increase information and awareness about causes of and potential measures to reduce seabird mortality in this fishery. Both would provide the Service with more reliable information by the end of the three-year permit term, and allow us to better identify key measures that would benefit seabirds during subsequent permitting actions. Alternative 2 would encourage the clarification of mechanisms causing seabird take and identification of measures to reduce or offset it. Alternative 3 would additionally require targeted studies during the permit term to more rapidly and precisely identify potential minimization measures, and might have greater associated costs to NMFS. Alternative 3 also would encourage more rapid implementation of any measures identified in these studies by NMFS. We are identifying Alternative 2 as our preferred alternative because it would provide better information on seabird mortality and causes than under the no-action alternative, and would have minimal impacts to the fishery and limited economic costs within the permit term.

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7: List of Agencies and Persons Consulted

U.S. Fish and Wildlife Service, Regional Migratory Bird offices

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